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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/551,432	09/29/2005	Kenichi Machida	053087	2955

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WESTERMAN, HATTORI, DANIELS & ADRIAN, LLP
1250 CONNECTICUT AVENUE, NW
SUITE 700
WASHINGTON, DC 20036

EXAMINER

BURKHART, ELIZABETH A

ART UNIT	PAPER NUMBER
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1792

MAIL DATE	DELIVERY MODE
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12/14/2007

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

<p align="center">Office Action Summary</p>	<p>Application No.</p> <p>10/551,432</p>	<p>Applicant(s)</p> <p>MACHIDA ET AL.</p>	
	<p>Examiner</p> <p>Elizabeth Burkhart</p>	<p>Art Unit</p> <p>1792</p>	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 19 November 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 3,4 and 9-14 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 3,4 and 9-14 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 29 September 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f):
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claims 3, 4, and 9-16 are pending in this application. Amended claims 3, 4, and 9-14 and cancelled claims 8, 15, and 16 have been noted.

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 8/21/2007 has been entered.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

2. Claims 3, 4, and 9-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hirozawa et al (JP 62-074048) and Kaino et al (JP 01-117303) in view of Makita et al (JP 2001-135511), Nishiuchi et al ('089), Kadokura et al ('739), Kamiya (JP 2000-319778), and Wang et al ('975).

Hirozawa discloses a method of manufacturing a high-efficiency rare earth permanent magnet, wherein the magnet is a Nd-Fe-B system or a Pr-Fe-B system, and deterioration of magnetic properties is prevented by depositing a rare earth element such as Tb or Dy onto the previously grinded surface of said magnet by a sputtering method. Heat treatment is applied to said magnet in a vacuum after said sputtering deposition replacing a layer damaged by working with a reformed layer (Abstract). Diffusing the rare earth element has the effect of improving the magnetic characteristic (BH)max as evidenced by Kaino et al. ('303).

Kaino discloses a method of depositing a rare earth element such as Tb or Dy onto a rare earth permanent magnet, wherein the magnet is a Nd-Fe-B system or a Pr-Fe-B system, by a sputtering method to avoid a decrease of the magnetic characteristic (BH)max. Heat treatment is performed after sputtering to diffuse the rare earth material not only on the surface of the magnet, but to the inward thereof (Abstract).

Hirozawa and Kaino do not disclose:

- a. the shape of the magnet, the surface to volume ratio of the magnet, or inserting an electrode wire into the hole of the magnet, or loading the magnet into a ire basket,
- b. oppositely disposed ring-like targets,

c. making the magnet electrically negative through the electrode wire.

a. Makita discloses a microminiature rare earth permanent magnet coated with an anticorrosion covering wherein the surface area of $S \text{ mm}^2$ and the volume of $V \text{ mm}^3$ are variable and the surface to volume ratio (S/V) ranges from $1\text{-}50 \text{ mm}^{-1}$ [0014] in order to prevent the degradation of the magnetic properties of said magnet [0001]. In a specific example, S/V is 2 mm^{-1} and the volume is 27 mm^3 [0045].

Nishiuchi discloses a vapor deposition apparatus comprising a vacuum chamber, an evaporating section for evaporating material, and a holding member for rare earth permanent magnets (Col. 3, lines 12-19 and Col. 4, lines 5-7). The holding member may consist of cylindrical stainless steel mesh barrels in which the magnets may tumble (Col. 6, lines 44-50) or the holding member may be a structure which can hold hanging ring-shaped magnets (Fig. 6, Col. 10, lines 28-34). The open area of the mesh barrels depends on the size and shape of the magnets (Col. 9, lines 65-67). The vapor deposition apparatus is used to deposit a coating onto the magnets wherein the coating applied is uniform.

It would have been obvious to one of ordinary skill in the art at the time of invention by applicant to use the apparatus suggested by Nishiuchi in the processes of Hirozawa et al. ('048) and Kaino et al. ('303), wherein the permanent magnet has the dimensions as suggested by Makita et al. ('511), in order to deposit a uniform coating and better prevent the degradation of the magnetic properties of said magnet.

b. Kadokura discloses a method for depositing a thin film onto a substrate by opposed target type sputtering to produce a uniform thin film at a high deposition rate (Col. 1, lines 19-22 and Col. 3, lines 24-27).

Kamiya ('778) discloses using oppositely-disposed ring-like targets in a sputtering process to form a high quality thin film at a high speed (Abstract).

It would have been obvious to one of ordinary skill in the art at the time of invention by applicant to incorporate oppositely disposed ring-like targets as suggested by kadokura and Kamiya into the processes of Hirozawa and Kaino in order to produce a high quality thin film at high speeds with good uniformity.

c. Wang discloses that when sputtering, the wafer pedestal may be made electrically negative to accelerate the positive metal ions so that they not only strike the top planar surface of the substrate, but also reach deep within the hole in the substrate to coat the bottom and side walls of the hole (Col. 4, lines 39-44).

It would have been obvious to one of ordinary skill in the art at the time of invention by applicant to make the magnets electrically negative as suggested by Wang through the metal wire of Nishiuchi holding the ring-like magnets in order to deposit a uniform coating onto all sides of the magnet, including the inside walls of the hole in the ring-like magnets.

Regarding Claims 3 and 9, it would have been obvious to one of ordinary skill in the art that the process of diffusing a layer of rare earth metal on a rare earth permanent magnet that had been damaged by cutting or grinding as suggested by Hirozawa and Kaino, the permanent magnet with the dimensions as suggested by Makita, wherein the

Art Unit: 1792

coating was deposited using the vapor deposition device of Nishiuchi improves the magnetic characteristic (BH)max, therefore it is result effective and can be optimized through routine experimentation in order to recover the (BH)max value to 280 kJ/m³ or more. Also, the space created between the oppositely disposed targets would inherently allow the metal particles to fly three-dimensionally to deposit onto all sides of the magnet.

Regarding Claims 4 and 10, determining whether to diffuse the rare earth metal while depositing the coating at a high temperature or diffusing the rare earth metal by heat treatment after depositing the coating would merely constitute a design feature in which it would be obvious for one of ordinary skill to incorporate into the processes of Hirozawa and Kaino.

Regarding Claims 11 and 13, Hirozawa et al. ('048) discloses the heat treatment to diffuse the rare earth metal after sputtering is performed in a vacuum or an inert atmosphere which would contain a concentration of impurity gases of less than 50 ppm.

Thus, claims 3, 4, and 9-14 would have been obvious within the meaning of 35 USC 103 over the combined teachings of Hirozawa, Kaino, Makita, Nishiuchi, Kadokura, Kamiya, and Wang.

Response to Arguments

3. Applicants argue that Hirozawa, Kaino, Kadokura, and Nishiuchi do not disclose all of the limitations in amended claims 3 and 9, specifically the limitations of "allowing the metal vapor to fly three-dimensionally and deposit to form a uniform film" and "while

Art Unit: 1792

the magnet is made to be electrically negative through the electrode wire." These limitations have been addressed in the above rejection.


Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Elizabeth Burkhart whose telephone number is (571) 272-6647. The examiner can normally be reached on Monday-Thursday, 7:00 AM-5:30 PM, EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Timothy Meeks can be reached on (571) 272-1423. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

eab


TIMOTHY MEEKS
SUPERVISORY PATENT EXAMINER